BRM 05/29.4.14

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Building & Highway Material Testing Laboratory

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Job No.: CTCE/BBMP/W.No.08/KNR/WMM/Gradation/2013-14 06.03.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Mr.K. Narasimharaju,** Contractor, Bangalore.

Name of Work : Improvements to Roads and Drain at Balaji Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KH/(WO)/234/2013-14 Dated: 04.03.2014

Date of Testing : 06.03.2014

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): 26300

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	985	985	3.7	96.3	95-100
22.4	6545	7530	28.6	71.4	60-80
11.2	5690	13220	50.3	49.7	40-60
4.75	4425	17645	67.1	32.9	25-40
2.36	3750	21395	81.3	18.7	15-30
0.600	2465	23860	90.7	9.3	8-22
0.075	2155	26015	98.9	1.1	0-8

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Job No.: CTCE/BBMP/W.No.08/KNR/SDBC/Bitumen/2013-14 14.03.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr.K. Narasimharaju,** Contractor, Bangalore.
NAME OF THE WORK	Improvements to Roads and Drain at Balaji Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/KH/(WO)/234/2013-14 Dated: 04.03.2014
SAMPLE I/D	Roads and Drain at Balaji Layout in Ward No.08,
DATE OF TESTING	14.03.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474.5	475.5
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25.5	24.50
7. Bitumen content in %	5.10	4.90
8. Average	5.00	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	22.36	4.71	4.71	95.29	90-100
4.75	243.6	51.34	56.05	43.95	35-51
2.36	57.88	12.20	68.25	31.75	24-39
1.18	44.87	9.46	77.70	22.30	15-30
0.3	46.53	9.81	87.51	12.49	9-19
0.075	32.25	6.80	94.31	5.69	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	26.65	5.33	5.33	94.67	90-100
4.75	245.2	49.04	54.37	45.63	35-51
2.36	93.66	18.73	73.10	26.90	24-39
1.18	53.42	10.68	83.79	16.21	15-30
0.3	32.25	6.45	90.24	9.76	9-19
0.075	23.75	4.75	94.99	5.01	3-8

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Job No.: CTCE/BBMP/W.No.08/KNR/AIV/2013-14 06.03.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr.K. Narasimharaju,** Contractor, Bangalore.
Name of the Work	Improvements to Roads and Drain at Balaji Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KH/(WO)/234/2013-14 Dated: 04.03.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	06.03.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	389	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	302	
4	Aggregate Impact value = percent fines	22.16	22.37	
	100* (W_2/W_1)%			22.26

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.08/KNR/WMM/S-T/2013-14 06.03.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr.K. Narasimharaju,** Contractor, Bangalore.
Name of Work	Improvements to Roads and Drain at Balaji Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KH/(WO)/234/2013-14 Dated: 04.03.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	06.03.2014

Result : Flakiness Index = **12.35%**

Elongation Index = **13.12%**

Result : Combined Flakiness & Elongation index 25.47%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.08/KNR/SDBC/AIV/2013-14 14.03.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr.K. Narasimharaju,** Contractor, Bangalore.
Name of the Work	Improvements to Roads and Drain at Balaji Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KH/(WO)/234/2013-14 Dated: 04.03.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	14.03.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	80	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	20.63	21.05	20.84

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.08/KNR/SDBC/Shape_T/2013-14 : 14.03.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr.K. Narasimharaju,** Contractor, Bangalore.
Name of Work	: Improvements to Roads and Drain at Balaji Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: AEE/KH/(WO)/234/2013-14 Dated: 04.03.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 14.03.2014

Result : Flakiness Index = **12.56%**

Elongation Index = **13.85%**

Result : Combined Flakiness & Elongation index **26.41%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.08/KNR/SDBC/Stripping/2013-14 14.03.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr.K. Narasimharaju,** Contractor, Bangalore.
Name of the work	Improvements to Roads and Drain at Balaji Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KH/(WO)/234/2013-14 Dated: 04.03.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	14.03.2014

Type of binder : 60/70
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.4	3.27	96.73
2	3.3		
3	3.1		

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.08/KNR/SDBC/Sp_Wa/2013-14 14.03.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr.K. Narasimharaju,** Contractor, Bangalore.
Name of the Work	Improvements to Roads and Drain at Balaji Layout in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KH/(WO)/234/2013-14 Dated: 04.03.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	14.03.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2021	2022	2023	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1266	1267	1268	
4	Weight of saturated surface dry aggregate in air	W_3 g	2025	2026	2027	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	759	759	759	
6	Weight of oven dried aggregate	W_4 g	2010	2015	2014	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.648	2.655	2.653	2.652
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.702	2.694	2.700	2.698
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.75%	0.55%	0.65%	0.65%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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